

Released Assessment Questions: Academic

Answer Key

1 ○ ○ ○ ●

2 ○ ○ ● ○

3 ○ ○ ○ ●

4 ○ ○ ○ ●

5 ○ ○ ○ ●

6 ○ ● ○ ○

7 ○ ● ○ ○

8 ○ ○ ● ○

9 ● ○ ○ ○

10 ● ○ ○ ○

11 ○ ○ ○ ●

12 Open-Response

13 Open-Response

14 Open-Response

15 Open-Response

16 Open-Response

17 Open-Response

18 Open-Response

19 ○ ○ ● ○

20 ○ ● ○ ○

21 ● ○ ○ ○

22 ● ○ ○ ○

23 ○ ○ ○ ●

24 ○ ○ ● ○

25 ○ ○ ○ ●

26 ○ ● ○ ○

27 ○ ○ ● ○

28 ○ ○ ○ ●

29 ○ ● ○ ○

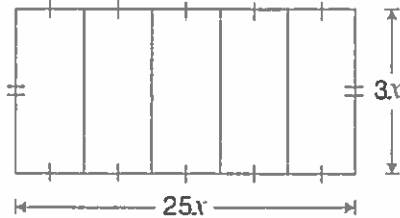
30 ○ ○ ○ ●

31 ● ○ ○ ○



Remember to write your answers in your **Answer Booklet**.

1 A rectangle is divided into 5 equal sections as pictured below.



Which of the following represents the area of **one** section?

- a $8x$
- b $8x^2$
- c $15x$
- d $15x^2$

$$\begin{aligned} (25x)(3x) &\div 5 \\ &= 75x^2 \div 5 \\ &= 15x^2 \end{aligned}$$

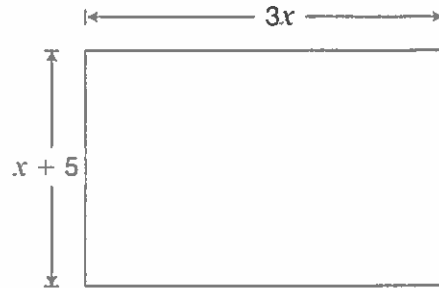
2 The table below contains five expressions.

$p \times p \times p \times p \times p \times p$	$= p^6$ ✓
$p^2 \times p^2 \times p^2$	$= p^{2+2+2} = p^6$ ✓
$p^2 \times p^3$	$= p^{2+3} = p^5$ ✗
p^5	✗
p^6	✓

How many of these expressions are equivalent to $(p^2)^3$? $= p^{2(3)} = p^6$

- a 1
- b 2
- c 3
- d 4

3 A rectangle is shown below with algebraic expressions for its length and width in centimetres.



Which expression represents the area of the rectangle in cm^2 ?

- a $4x + 5$
- b $8x + 10$
- c $3x^2 + 5$
- d $3x^2 + 15x$

$$\begin{aligned} &3x(x+5) \\ &= 3x^2 + 15x \end{aligned}$$

4 What is the solution to the equation below?

$$\frac{2}{3}x - 4 = 20$$

a $x = 12$

b $x = 16$

c $x = 24$

d $x = 36$

$$\frac{2}{3}x = 24$$

$$x = 24 \times \frac{3}{2}$$

$$x = 36$$

5 Mia sells T-shirts from a booth at a market. She pays \$30 to rent the booth. Each T-shirt costs her \$1.50, and she sells them for \$7.50 each.

Her goal is to make \$200 after she pays for the booth and the T-shirts.

What is the minimum number of T-shirts Mia must sell to reach her goal?

a 27

b 29

c 34

d 39

$$\text{Profit} = 7.50n - 1.50n - 30$$

$$P = 6n - 30$$

$$6n - 30 = 200$$

$$6n = 230$$

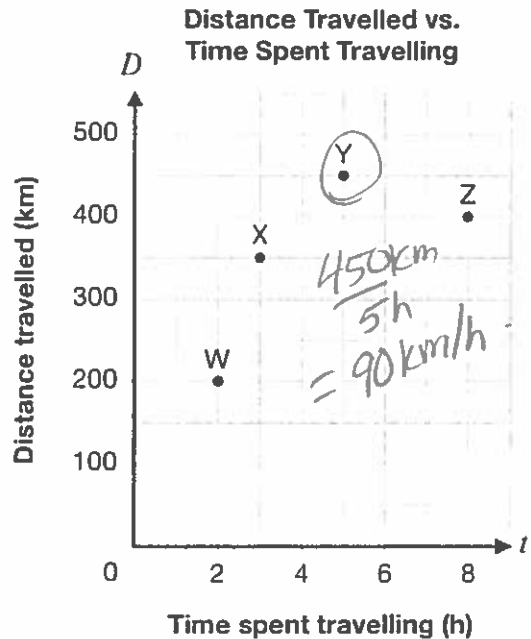
$$n = 38.3$$

needs to sell
39 to make
at least
\$200

6 Joanne drives for 2.5 hours at a constant speed and travels 250 km.

François drives at a constant speed exactly 10 km/h less than Joanne's speed.

Which point on the graph below could represent the distance travelled and time spent travelling for François?



a Z

b Y

c X

d W

$$\text{Joanne } \frac{250 \text{ km}}{2.5 \text{ h}}$$

$$= 100 \text{ km/h}$$

$$\text{François speed} = 90 \text{ km/h}$$

7 Which of the following shows information from a linear relation between C and n ?

a

n	C
0	0
1	1
2	3

Handwritten annotations for table a: A bracket on the left groups the rows $n=0, 1, 2$ with a '1' next to it. A bracket on the right groups the rows $n=1, 2$ with a '2' next to it. A large 'X' is drawn to the right of the table.

b

n	C
0	-7
2	-5
4	-3

Handwritten annotations for table b: A bracket on the left groups the rows $n=0, 2, 4$ with a '2' next to it. A bracket on the right groups the rows $n=2, 4$ with a '2' next to it. A checkmark is drawn to the right of the table.

c

n	C
0	-9
4	-6
16	-3

Handwritten annotations for table c: A bracket on the left groups the rows $n=0, 4, 16$ with a '4' next to it. A bracket on the right groups the rows $n=4, 16$ with a '3' next to it. A large 'X' is drawn to the left of the table.

d

n	C
0	2
5	4
20	6

Handwritten annotations for table d: A bracket on the left groups the rows $n=0, 5, 20$ with a '5' next to it. A bracket on the right groups the rows $n=5, 20$ with a '2' next to it. A large 'X' is drawn to the left of the table.

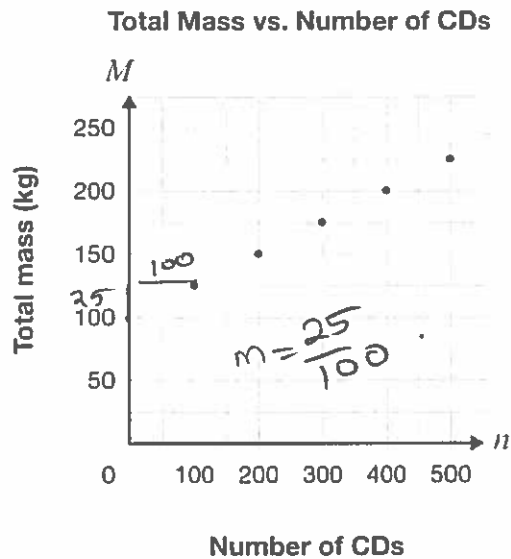
8 The total cost of yearbooks for a school is made up of a \$375 set-up fee and \$25 for each yearbook purchased. $\rightarrow b$ $\rightarrow m$

There is a linear relationship between the total cost and the number of yearbooks purchased.

What type of variation is this relationship, and what is its initial value?

- a direct variation, \$375
- b direct variation, \$25
- c** partial variation, \$375
- d partial variation, \$25

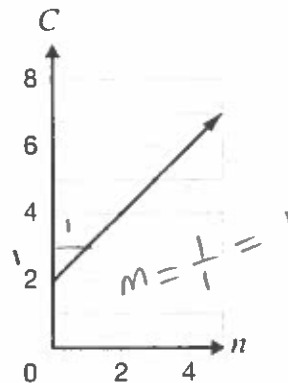
- 9 A company ships CDs in crates of equal size. The graph below shows the relationship between the total mass of a crate and the number of CDs it contains.



Which of the following equations represents the relationship between the total mass of a crate, M , and the number of CDs it contains, n ?

- a $M = 0.25n + 100$
- b $M = 4n + 100$
- c $M = 0.25n + 125$ X
- d $M = 4n + 125$ X

- 10 A relationship is represented by the following graph.



Which equation represents this relationship?

- a $C = n + 2$
- b $C = n + 1$ X
- c $C = 2n + 2$
- d $C = 2n + 1$ X

- 11 A local band pays \$5000 to record its first album and \$0.15 for each CD made.

The band pays \$7000 to record its second album and \$0.10 for each CD made.

How will the graph of the relationship between the total cost and the number of CDs made for the second album differ from the graph for the first album?

The graph of the line for the second album will start

- a lower on the vertical axis and be steeper. X
- b higher on the vertical axis and be steeper. X
- c lower on the vertical axis and be less steep.
- d higher on the vertical axis and be less steep.

12 More Snacks, Please!

Raisins and sunflower seeds are sold together in packages of 250 g. The ratio of the mass of raisins to the mass of sunflower seeds is 3 to 5.

Determine the mass of raisins in a package.

Show your work.

$$r : s = 3 : 5 \quad \text{--- 3 parts raisins for every 5 parts seeds (total 8 parts)}$$

Let r represent the mass of raisins (g)
 " s " " " " sunflower seeds (g)

$$\frac{\text{raisins}}{\text{total}} \frac{3}{8} = \frac{r}{250} \quad \leftarrow \begin{array}{l} \text{raisins in mixture} \\ \text{total mixture} \end{array}$$

$$\frac{r}{250} \times 250 = \frac{3}{8} \times 250$$

$$r = 93.75 \text{ grams}$$

\therefore there is 93.75 grams of raisins in the mixture.

13 Getting Fit

Maddie enrolls in a fitness program. Her total cost is made up of a sign-up fee and a cost per class. The table below shows information about her total cost, C , in dollars, when she attends n classes.

Number of classes, n	Total cost, C (\$)
12	67
14	74

What is the sign-up fee?

Sign-up fee: \$25.

Show your work.

$$\begin{aligned}
 m &= \frac{74 - 67}{14 - 12} \\
 &= \frac{7}{2} \\
 &= 3.5 \\
 &\$3.50 / \text{class}
 \end{aligned}$$

$$\begin{aligned}
 y &= mx + b \\
 \text{use either } (12, 67) \text{ or } (14, 74) \\
 \text{as } (x, y), m &= 3.5 \\
 67 &= 3.5(12) + b \\
 67 &= 42 + b \\
 b &= 67 - 42 \\
 b &= 25
 \end{aligned}$$

Is the relationship between the number of classes Maddie attends and her total cost a partial variation or direct variation?

Circle one:

Partial variation

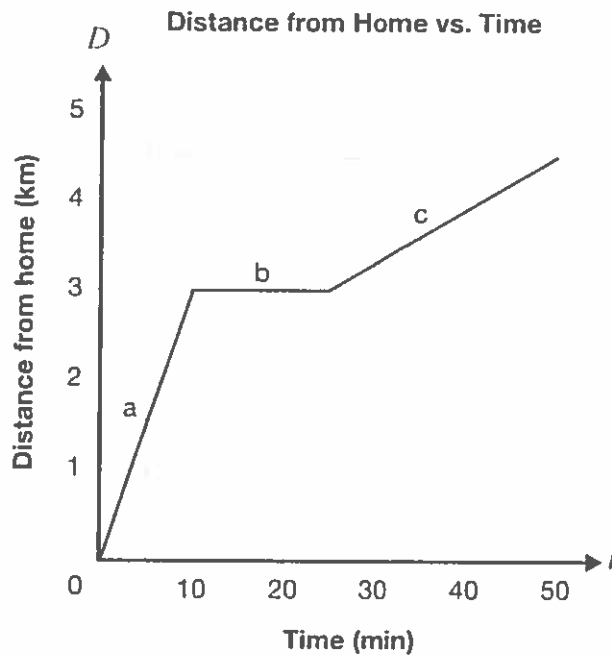
Direct variation

Justify your answer.

'Initial value' is \$25 not \$0
 (she pays \$25 to sign-up even if she attends no classes).

14 Kenny's Big Adventure

The following graph represents the relationship between Kenny's distance from home on a bike ride and time.



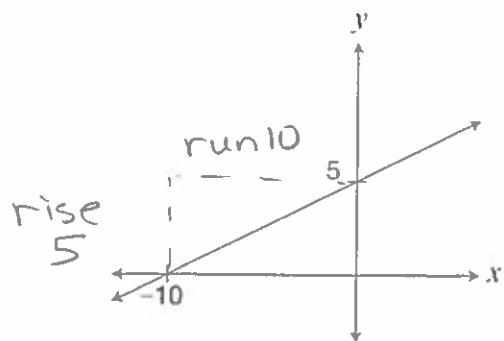
Describe the 3 segments of Kenny's ride. Include information about distance travelled, time, direction and speed, in km/min, for each segment.

Segment	Distance travelled	Time	Direction	Speed (km/min)
a	3km	10min	away from home	$\frac{3}{10}$ = 0.3 km/min
b	0 km	15 min	no movement	0 km/min
c	1.5 km	25 min	away from home	$\frac{1.5}{25}$ = 0.06 km/min.

15 Comparing Relationships

Information about three linear relationships is given below.

Relationship 1



$$m = \frac{\text{rise}}{\text{run}}$$

$$= \frac{5}{10}$$

$$= \frac{1}{2}$$

Relationship 2

$$3x + 6y + 1 = 0$$

$$3x + 6y + 1 - 3x - 1 = 0 - 3x - 1$$

$$6y = -3x - 1$$

$$\frac{6y}{6} = \frac{-3x}{6} - \frac{1}{6}$$

$$y = -\frac{1}{2}x - \frac{1}{6}$$

$$m = -\frac{1}{2}$$

Relationship 3

x	y
-2	-3
0	-2
2	-1
4	0

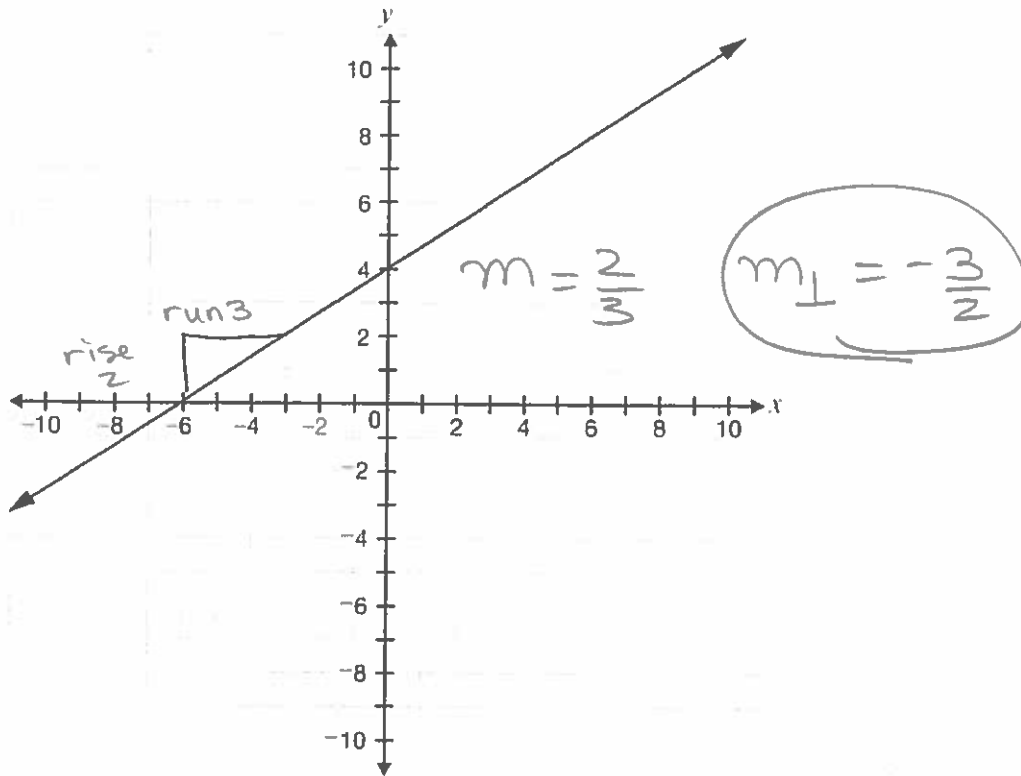
$$m = \frac{1}{2}$$

Circle the relationships that have the same rate of change.

Justify your answer. Include information about all three relationships.

16 Making Equations!

Determine the equation of the line that has the same y-intercept as $2x + y + 6 = 0$ and is perpendicular to the line shown on the grid.



Show your work.

$$2x + y + 6 = 0$$

$$y = -2x - 6$$

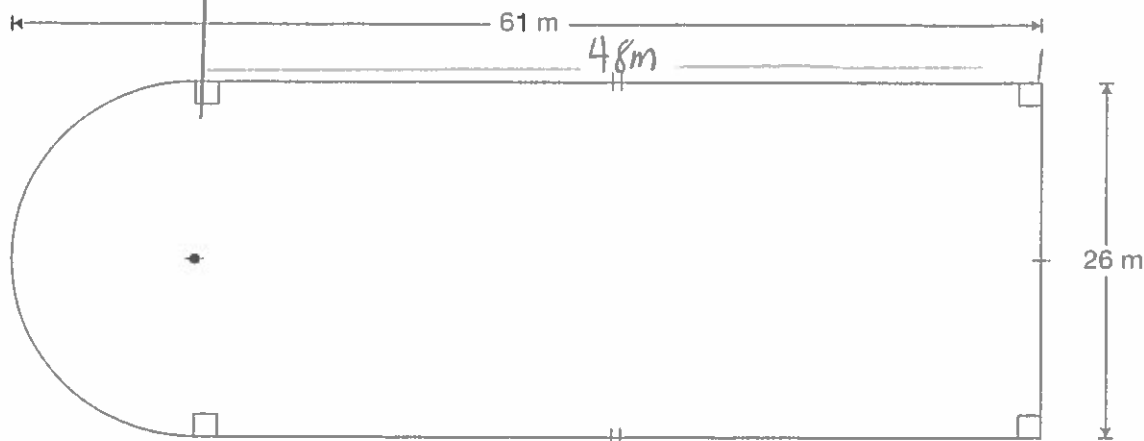
$$b = -6$$

$$\therefore y = -\frac{3}{2}x - 6$$

is perpendicular to the line on the grid and through the same y-intercept as $2x + y + 6 = 0$.

17 Skate On!

A diagram of a community ice rink is shown below.



The rink is being enclosed with fencing that costs \$6.20/m.

Determine the total cost of fencing for the rink.

Show your work.

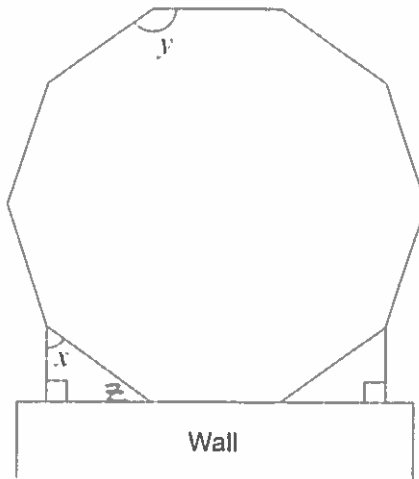
$$\begin{aligned}
 P &= \frac{1}{2} \text{ circle} + 48 + 26 + 48 \\
 &= \frac{1}{2} (2\pi r) + 122 \\
 &= 13\pi + 122 \\
 &= 162.84 \text{ m.}
 \end{aligned}$$

$$\begin{aligned}
 \text{Cost} &= 162.84 \times 6.20 \\
 &= \$1009.61
 \end{aligned}$$

\therefore the fencing would cost \$1009.61

18 A Schoolyard

A schoolyard is in the shape of a regular decagon, as pictured below.



Complete the chart below with the values of x and y . Justify your answers using geometric properties.

Value	Justification using geometric properties
$x = 54^\circ$	$z = \frac{360^\circ}{10} \text{ (PEAST)}$ <p>Sum of exterior angles is 360°</p> $z = 36^\circ$ $x = 180^\circ - 90^\circ - 36^\circ \text{ (ASTT)}$ <p>Sum of angles in triangle is 180°</p> $x = 54^\circ$
$y = 144^\circ$	$10y = 180(n-2), n=10$ $10y = 180(8)$ $10y = 1440$ $y = 144^\circ$ <p>(ASPT) Sum of angles in polygon is (number of sides subtract two) times 180°.</p>



Go to the *Answer Booklet* and complete the seven open-response questions before continuing with question 19.

12 Open-Response

13 Open-Response

14 Open-Response

15 Open-Response

16 Open-Response

17 Open-Response

18 Open-Response

19 Which equation does **not** represent a linear relation?

- a $y = 0$ horizontal line
 b $x = 5$ vertical line
 c $x^2 + y = 9$ "parabola" → grade 10
 d $2x + y - 5 = 0$ standard form of a line

20 What is the slope of the line represented by the equation below?

$$0 = 2x - 10y + 7$$

a 5

b $\frac{1}{5}$

c $-\frac{1}{5}$

d -5

$$10y = 2x + 7$$

$$y = \frac{2}{10}x + \frac{7}{10}$$

$$y = \frac{1}{5}x + \frac{7}{10}$$

m

21 The end points of line segment AB are A(3, -12) and B(6, k).

What is the value of k if the slope of line segment AB is -2?

- a -18
- b -6
- c 6
- d 18

$$m = \frac{k+12}{6-3}$$

$$\frac{k+12}{3} = -2$$

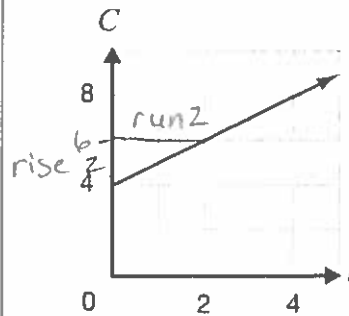
$$k+12 = -6$$

$$k = -18$$

22 Information about three different relationships between C, in dollars, and t, in hours, is shown below.

t (h)	C (\$)
0	10
2	14
4	18

$$m = \$2/\text{hr}$$



$$m = \$1/\text{hr}$$

$$C = 4 + (0.5)t$$

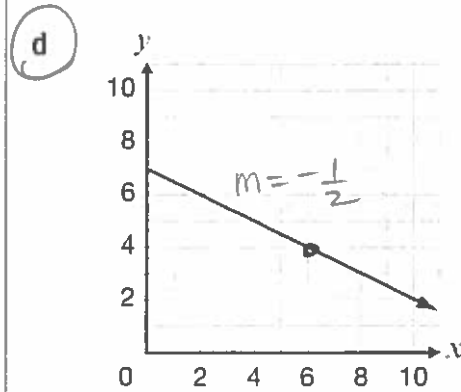
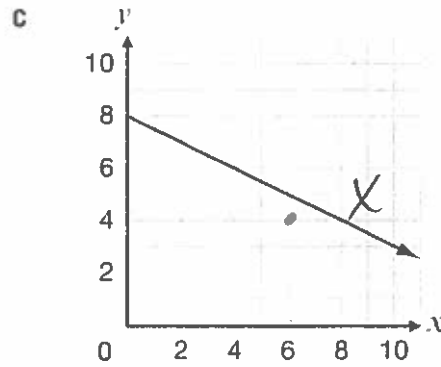
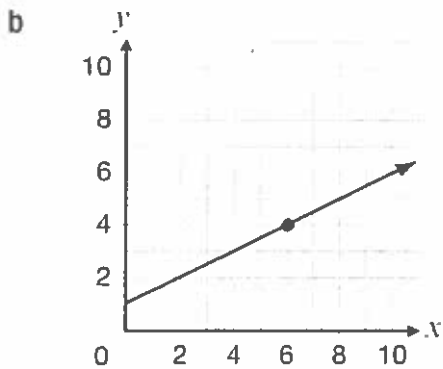
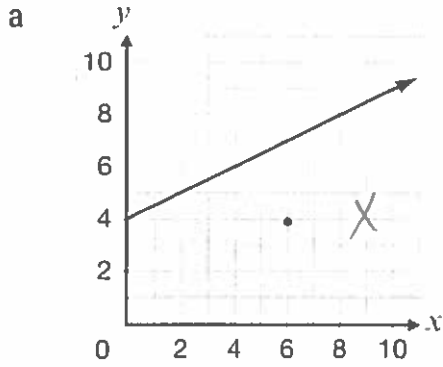
$$m = \$0.5/\text{hr}$$

How many of the three relationships between C and t have a rate of change of \$4 per hour?

- a 0
- b 1
- c 2
- d 3

23 A line passes through the point (6, 4) and has a slope of $-\frac{1}{2}$.

Which of the following graphs represents this line?



- 24 The maximum number of tickets that can be sold for a school play is 350.

The total profit earned, P , can be determined using the equation $P = 4.50n - 1080$, where n is the total number of tickets sold.

Which of the following statements is true?

- a The maximum profit is \$1080.
- b The maximum profit is \$1575.
- c The total profit is \$0 when 240 tickets are sold.
- d The total profit is \$0 when 350 tickets are sold.

$$P = 4.5(350) - 1080$$

$$= 495$$

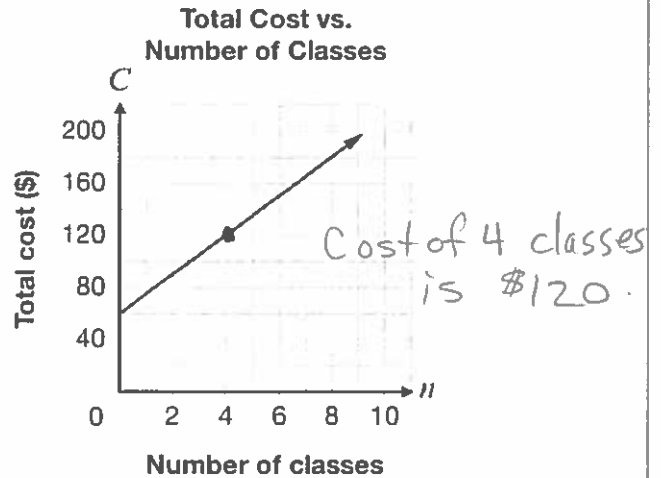
$$P = 0$$

$$4.5n - 1080 = 0$$

$$4.5n = 1080$$

$$n = 240$$

- 25 Two gyms offer fitness classes. The graph below shows the total cost for the first gym.



For 4 classes, both gyms have the same total cost.

Which of the following could represent the total cost for the second gym?

- a $C = 60 + 4n$ $16 + 60 = 76$ X
- b $C = 40 + 15n$ $40 + 60 = 100$ X
- c The total cost is made up of a membership fee of \$60 and \$10 per class. $60 + 40 = 100$
- d The total cost is made up of a membership fee of \$40 and \$20 per class. $40 + 20(4) = 120$

26 The table below lists the widths of four rectangles, each with an area of 72 cm^2 .

	Width (cm)	Length
Rectangle 1	6	12
Rectangle 2	8	9
Rectangle 3	10	7.2
Rectangle 4	18	4

Which rectangle has the smallest perimeter?

- a Rectangle 1
- b Rectangle 2
- c Rectangle 3
- d Rectangle 4

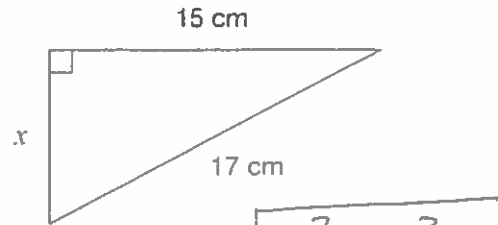
Closest to square.
 $\sqrt{72} = 8.485$

27 Salt is sold in packages in the shape of a rectangular-based prism that is not a cube. A new package in the shape of a cube is designed to contain the same volume.

Which of the following is true about the new package?

- a It holds less salt.
- b It holds more salt.
- c It requires less material.
- d It requires more material.

28 According to the Pythagorean theorem, what is the length of the third side of the triangle, x ?

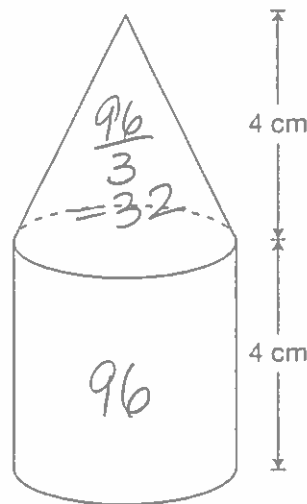


- a 2 cm
- b 4 cm
- c 6 cm
- d 8 cm

$$x = \sqrt{17^2 - 15^2}$$

$$x = 8$$

29 The figure pictured below is made up of a cone on top of a cylinder.



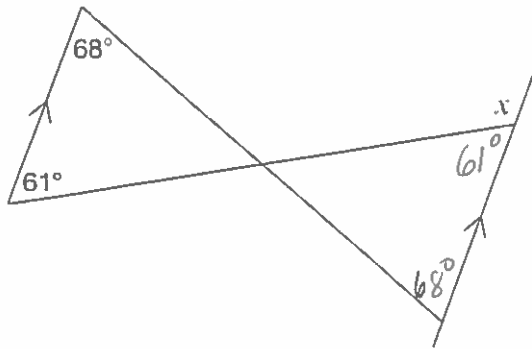
The cylinder has a volume of 96 cm^3 .

What is the volume of the figure?

- a 120 cm^3
- b 128 cm^3
- c 144 cm^3
- d 192 cm^3

$$96 + 32 = 128$$

30 Consider the diagram below.



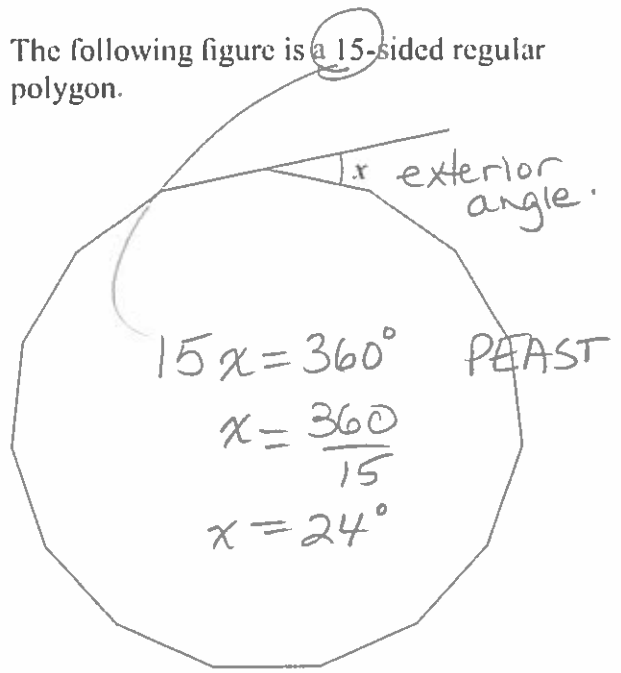
What is the value of x ?

- a 61°
- b 68°
- c 112°
- d 119°

Alternate Angles
TPT-Z,
Supp.

$$180^\circ - 61^\circ = 119^\circ$$

31 The following figure is a 15-sided regular polygon.



$15x = 360^\circ$ PEAST
 $x = \frac{360}{15}$
 $x = 24^\circ$

What is the value of x shown in the diagram?

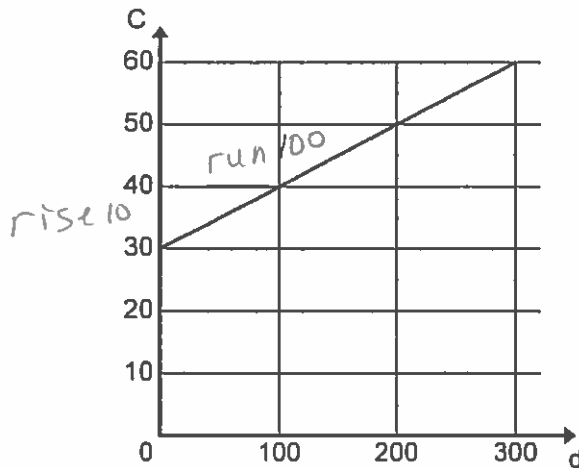
- a 24°
- b 34°
- c 46°
- d 48°

PART A:

In pairs ...

- Choose the correct answer AND
- Describe a common error someone might make to select ONE of the wrong answers.
Record your thinking on a whiteboard.

QUESTION:



Which equation represents the line on the graph?

- a) $C = 0.1d + 30$
- b) $C = d + 30$
- c) $C = 0.4d + 30$
- d) $C = 10d + 30$

$$m = \frac{10}{100}$$

did not use scale
run
rise x

Now one partner will be the collector of information, the other will be the provider.

1. When the lights flash, the provider stays put, the collector moves one group to the left.
2. The provider shares his/her solution with the collector. The provider must justify his/her choice and description and then answer any clarifying questions the collector asks.
3. The collector may not judge or comment on the provider's solution. The collector may only listen and record information about the provider's solution and ask any necessary clarifying questions.
4. When the lights flash again, the collector moves to the left, the provider stays still.
5. Repeat the previous process. Until the collector has moved three times and the provider has described the same solution to three different people.
6. When lights flash twice, it is time to return to original pairs.
7. The Collector then shares his/her findings with the provider. The pair determines whether they should keep their answer the same or change their choice. They have the opportunity to modify their description at this time as well.

PART B:

In pairs, come up with the correct answer to the following question as well as several options for the remaining answers, with descriptions of common mistakes. Compare your choices with another group.

QUESTION:

Rearrange $4y - x = 8$ so that it is in the form $y = mx + b$.

$$4y = 8 + x$$
$$\frac{4y}{4} = \frac{x}{4} + \frac{8}{4}$$
$$y = \frac{1}{4}x + 2$$